

Message Text

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ACTION EUR-12

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FM AMEMBASSY OTTAWA

TO SECSTATE WASHDC 3946

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DEPT FOR EUR/CAN, OES/NET/ADLER; ERDA FOR SIEVERING AND
NEWBY

DEPT PLEASE PASS DEPT OF COMMERCE, MARITIME ADMINISTRATION
FOR LEVINE

E.O. 11652: N/A

TAGS: TATT, CA, EWWT

SUBJECT: NUCLEAR ICE-BREAKER DEBRIEFING

1. SUMMARY: ON 17 JUNE CECO HELD DEBRIEFING IN OTTAWA
TO TELL B&W WHY THEY LOST. REPRESENTATIVES FROM AECB,
AECL, AND CANADIAN COAST GUARD PRESENT. GENERAL CRITICISM
THAT PLANT DESIGN PROPOSED WAS FOR MERCHANT SHIP, NOT ICE-
BREAKER. ALSO PLANT DID NOT MEET CANADIAN NUCLEAR SAFETY
CRITERIA (NEITHER DID OTHERS). "WEAKNESSES" STEMMED FROM
CONSOLIDATED VERSUS DISPERSED DESIGN. SPECIFIC COMMENTS
ON A) COMPLEXITY OF FLOW PATTERNS WITH SPRAY FEED, MULTI-
PLE PUMPS, STEAM GENERATORS, AND VALVES; B) PRESSURE
VESSEL JOINTS AND OPENINGS; C) NO BACK-UP, SHUT-DOWN
SYSTEM; D) WEIGHT, SIZE, AND POWER LEVEL OF PLANT; E)
STABILITY UNDER RAPID AND LARGE CHANGES IN POWER DEMAND.

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ONLY KUDOS WERE EFFICIENT PRESENTATION; CAPABILITIES AND
EXPERIENCE OF B&W/NEWPORT NEWS TEAM; GOOD FUEL DESIGN;
AND BEST CONTROL ROD DRIVE MECHANISM. NO DISCUSSION OF
COMPETITIVE DESIGNS OR COSTS. END SUMMARY.

2. CECO CONSULTANTS LTD, WHO EVALUATED NUCLEAR ICE-
BREAKER PROPOSALS FROM GERMANY, U.K., FRANCE, AND U.S.

(BABCOCK AND WILCOX/NEWPORT NEWS SHIPBUILDING) FOR CANADIAN COAST GUARD (CCG) HELD DEBRIEFING FOR B&W ON 17 JUNE. PRESENTATIONS CONFINED TO TECHNICAL ISSUES, WITH OPPORTUNITY FOR QUESTIONS OF CLARIFICATION BUT NO REBUTTAL. ANNOUNCED IN ADVANCE WOULD BE NO DISCUSSION OF, OR COMPARISONS WITH OTHER PROPOSALS.

3. NICHOLSON, HEAD OF ASSESSMENT PANEL OF CECO, SAID CRITERIA DEVELOPED IN ADVANCE, WITH NUMERICAL RATINGS, FOR EVALUATING PROPOSALS. STRESSED IT WAS NECESSARY TO INTRODUCE "QUALITATIVE" AS WELL AS NUMERICAL ASSESSMENTS. ALSO COMMENTED NONE OF PROPOSALS WAS COMPLETELY RESPONSIVE. (EMBOFF ASKED QUESTION WHY, IF NONE RESPONSIVE, CECO DIDN'T THROW OUT ALL BIDS AND ASK FOR NEW ONES WHICH COULD MEET CRITERIA. ANSWER WAS THAT TIME WAS SHORT AND CECO BELIEVED ONE OF PROPOSED SYSTEMS COULD BE MODIFIED AND ADAPTED TO MEET REQUIREMENTS. DIDN'T SAY WHICH ONE OR HOW.)

4. NICHOLSON STATED GENERAL CRITICISM THAT PLANT DESIGN PROPOSED BY B&W WAS FOR MERCHANT SHIP AND NOT ICEBREAKER AND NOT ENOUGH ATTENTION GIVEN TO PECULIAR PERFORMANCE REQUIREMENTS OF LATTER. SAID DESIGN DID NOT COMPLY WITH CANADIAN NUCLEAR SAFETY CRITERIA, AS IT USED PRESSURE VESSEL, HAD NO SECOND SHUTDOWN SYSTEM, OR SEPARATE EMERGENCY CORE COOLING SYSTEM. CONCLUDED CONSOLIDATED LIMITED OFFICIAL USE

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SYSTEM NOT SUITABLE, LACKED CONTROL FLEXIBILITY IN HANDLING RAPID AND LARGE CHANGES IN POWER DEMAND. COMMENTED THAT PROPOSED SYSTEM VERY HEAVY, TOO WIDE, AND GREATER POWER LEVEL THAN NEEDED.

5. STANDEN OF CECO FOLLOWED WITH CRITICAL COMMENTS ON DESIGN ASPECTS INCLUDING: A) PRESSURE VESSEL--LID UNPROTECTED FROM THERMAL SHOCK; FLANGE TO VESSEL WELDS SUBJECT TO THERMAL TRANSIENTS; CIRCUMFERENTIAL WELD IN HIGH NEUTRON FLUX AREA; LARGE NUMBER OF OPENINGS INCREASE FAILURE PROBABILITY; B) FLOW PATTERNS--FOUR PUMPS FEEDING TWELVE STEAM GENERATORS, SUSCEPTIBLE TO VIBRATION; C) STEAM GENERATORS--WEIGHT TAKEN BY JOINT TO WALL; STRESS ANALYSES AND INSPECTION DIFFICULT; LEAKY TUBE DETECTION AND REPAIR VERY DIFFICULT; REPLACEMENT OF GENERATOR ALMOST IMPOSSIBLE; D) FEED WATER--DIDN'T LIKE WATER SPRAY INTO SUPERHEATED STEAM; E) INTEGRAL DESIGN--PRIMARY CIRCUIT VOLUME REQUIRES LARGE PRESSURE-SUPPRESSION SYSTEM; F) WATER SHIELDING--DIDN'T LIKE; AND G) VENTILATION SYSTEM --"NO GOOD FOR ARCTIC." STANDER REPEATED THAT NUCLEAR POWER PLANT DESIGNED FOR MERCHANT SHIP AND NOT ICE-BREAKER. PROPOSAL STATED MANY PLACES THAT B&W "WILL FIX" BUT NOT

HOW. MAGNITUDE OF "FIRST OF A KIND" DEVELOPMENT COSTS VERY LARGE THOUGH PROPOSAL SAYS "PROVEN DESIGN." DESIGN SCHEDULE 18 MONTHS LONGER THAN OTHERS. STATED DISADVANTAGES OF INTEGRAL SYSTEM WITH MANY STEAM GENERATORS AND FLOW COMPLEXITY OUTWEIGHS ADVANTAGES. SAID POSITIVE SIDE OF PROPOSAL WAS CAPABILITY AND EXPERIENCE OF B&W/NEWPORT NEWS TEAM, GOOD FUEL DESIGN, EFFICIENT PRESENTATION OF MATERIAL, AND BEST CONTROL ROD DRIVE MECHANISM.

7. GUMLEY OF CECO COMMENTED ON OPERATION AND SAFETY ASPECTS INCLUDING A) USE OF ZIRCALOY 4 VERSUS STAINLESS STEEL REQUIRES PRECONDITIONING, B) CONTROL SYSTEM FOR STEAM GENERATOR REQUIRES LARGE NUMBER OF VALVES; C) RESPONSE OF SYSTEM, WITH CONTROLS, TO 50 PERCENT TO 100 LIMITED OFFICIAL USE

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ACTION EUR-12

INFO OCT-01 ISO-00 OES-07 COME-00 EB-07 FEA-01 AID-05
CEA-01 CIAE-00 EPG-02 DODE-00 FPC-01 H-01 INR-07
INT-05 L-03 NSAE-00 NSC-05 OMB-01 PM-04 USIA-06
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PERCENT AND 100 PERCENT TO 50 PERCENT DEMAND CHANGES, IS "LUMPY;" WITHOUT CONTROL--UNSTABLE, OSCILLATORY; D) LONG PRIMARY LOOP TRANSIENT TIME; E) SAFETY AND LICENSING--SHUTDOWN ROD INSERTION TIME GOOD; NO PROPOSAL FOR SECOND SHUTDOWN SYSTEM; ECCS--NOT ADEQUATE SEPARATION OF PROCESS AND SAFETY SYSTEMS, NOT MEET CANDU STANDARDS; NO DEDICATED EMERGENCY WATER SUPPLY; SAFETY INSTRUMENTATION VULNERABLE.

8. JENNEKENS OF AECB MADE GENERAL STATEMENT QUESTIONING LICENSABILITY OF ANY PRESSURE VESSEL REACTOR SYSTEM IN CANADA. SINCE AECB HAS NO EXPERIENCE IN THIS AREA, CRITERIA WILL HAVE TO BE DEVELOPED. IN CONTRAST TO U.S., AECB WORKS WITH DESIGNERS, AND MANUFACTURERS IN DEVELOPING CRITERIA. THIS STILL TO BE DONE AND AECB CANNOT SAY AT THIS TIME THAT ANY OF FOUR PLANTS PROPOSED CAN MEET CANADIAN LICENSING STANDARDS. (AECB HOPES TO WORK WITH U.S. AND WITH U.S.S.R. IN DEVELOPING STANDARDS FOR ICE-BREAKER PLANT).

9. B&W REPRESENTATIVES ASKED QUESTIONS AND ALTHOUGH THEY DID NOT ATTEMPT REBUTTAL, SOME POINTS CAME OUT IN QUESTION PERIOD:

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-----A) FOK COSTS FOR DEMONSTRATION OF COMPONENTS OR SUB-SYSTEMS TO SATISFY NRC AND NOT DEVELOPMENT.

-----B) B&W COULD DESIGN TO MEET DIMENSIONAL REQUIREMENTS.

-----C) ZIRCALOY 4 HAS ADVANTAGES OVER STAINLESS STEEL IN COST OF URANIUM ENRICHMENT AND KNOWN PERFORMANCE.

-----D) DIFFERENCES IN A PLANT OF 314 MW VERSUS ONE OF 240 MW ARE NOT SIGNIFICANT.

-----E) ANY STEAM GENERATOR WILL SHOW OSCILLATIONS WITH POWER TRANSIENTS OF MAGNITUDE DISCUSSED. B&W HAS CAPABILITY FOR COMPUTER SIMULATIONS.

-----F) QUESTIONED CRITERIA WHICH SPECIFY SECOND INDEPENDENT SHUTDOWN SYSTEM FOR SHIP POWER PLANT. WILL IT WORK? IS IT DESIRABLE?

-----G) B&W NORMALLY DESIGNS TO STRICT SYSTEM OF SAFETY CRITERIA. NEEDS BETTER DEFINITION FOR THIS SYSTEM.

10. NICHOLSON COMMENTED DIDN'T CONSIDER ANY OF THE PROPOSALS AS "DEFINITIVE." NONE MET ALL CRITERIA. CECO TRIED TO ESTIMATE WHERE EACH SYSTEM COULD GO.

11. JOHNSON OF CCG SAID HE THOUGHT B&W PUT FORTH A GOOD PROPOSAL. EVALUATORS PICKED A "COMPANY" TO WORK WITH, NOT A REACTOR. IN TWO TO THREE WEEKS THE CCG INTENDS TO GO TO PRIVY COUNCIL TO DESCRIBE WHAT THEY WANT TO DO. WITH APPROVAL WILL SEEK FUNDING. SAID THE U.S.S.R. DELIGHTED WITH THE PERFORMANCE OF ITS NUCLEAR ICE-BREAKER

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AND ALL SHIPS OF THIS TYPE OVER 36,000 POUNDS WILL BE
NUCLEAR IN THE FUTURE. CLOSED BY THANKING B&W FOR THEIR
RESPONSE.

12. COMMENT: CECO TECHNICAL EVALUATION APPEARED SOMEWHAT
NAIVE, SHOWED LACK OF KNOWLEDGE OF STEAM GENERATORS, FLOW
SYSTEM AND PRESSURE VESSEL PERFORMANCE. APPARENTLY UNCON-
CERNED ABOUT USE OF HEU BY COMPETITIVE SYSTEMS AND
ATTENDANT SUPPLY PROBLEM. NOT FAMILIAR WITH PROVEN PER-
FORMANCE OF ZIRALLOY 4 AND WATER SHIELDING. IF B&W CAN GET
IN BALL PARK WITH COST NUMBERS, MAY BE ABLE TO MAKE
ANOTHER RUN AT CCG ON TECHNICAL GROUNDS. ENDERS

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